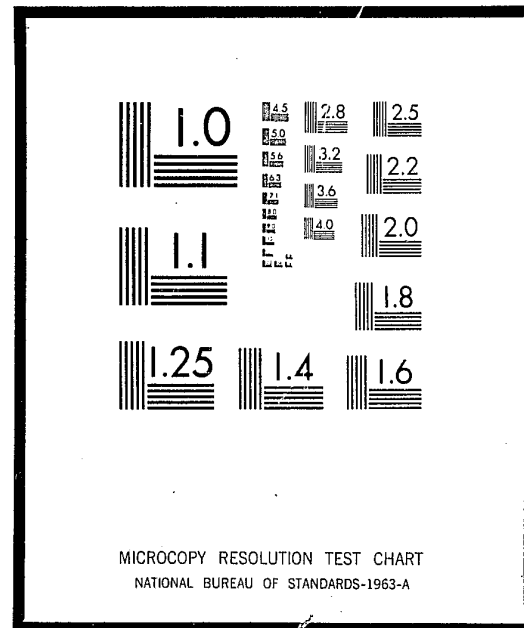


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STATISTICS DIVISION
Report #1/74

MINISTRY OF THE SOLICITOR GENERAL
and
SECRETARIAT OF TREASURY BOARD

February 11, 1974

A CANJUS PROJECT REPORT
#9

PREDICTION
OF
PENITENTIARY POPULATION
VOLUME II

by
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CANJUS PROJECT

The CANJUS project is a project being undertaken by the Statistics Division of the Ministry of the Solicitor General with the assistance of the Planning Branch of the Treasury Board Secretariat. The objective of the project is to develop a comprehensive simulation model of the Canadian Criminal Justice System:

- 1) to develop a basic quantitative description of that system;
- 2) to assist in the planning of policy and program changes by agencies involved in the administration of that system; and,
- 3) to serve as the foundation for future analyses and research on the system.

The project team at the present time consists of (alphabetically) Neil Carroll, Gordon Cassidy, Elizabeth Cole, Carolyn Fuller, George Hopkinson, Brian Johnson, Heather Milne, Lynda Peach, Marvin Ross and John Townesend. Not all persons have been committed to the project full-time, but all have made a contribution, without which, some of the many CANJUS publications would not have been possible.

ACKNOWLEDGEMENT

This report would not have been possible without the full co-operation of the Judicial Division of Statistics Canada and many of the agencies, federal, provincial and local, involved in the administration of criminal justice in Canada. In particular, Ms. Francine Bertrand, Ms. Jane Angus and Ms. Sharon Card of Statistics Canada and their staff were most helpful in explaining tables and obtaining extra information where necessary. Responsibility for the manuscript, including any errors or omissions, must, however, remain with the authors.

DISCLAIMER

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INTRODUCTION

In December, 1973 a study for the Canadian Penitentiary Service was undertaken by the CANJUS team in order to prepare aggregate prediction figures on admissions to federal penitentiaries for the calendar year 1974. The figures were to be used as part of the program budgeting submission of the central agencies for the fiscal year 1974-1975.

In undertaking this particular prediction, the Statistics Division felt that it would serve as a pilot project for using its CANJUS planning model (see reference (1) for description of model methodology and reference (2) for the present form of the model) for predictive purposes within the Canadian criminal justice system (see reference (3) for the more general application of the model). The use of the model in such a preliminary form has had both its virtues and its drawbacks. The benefits of the model are that it can relate admissions to many other factors, either singularly or concurrently, in the Canadian Criminal Justice System; the drawbacks are mainly the linearity of the model, lack of built-in time-lags, and the preliminary form of some segments of the data base. (See references 4, 5 and 6 for

further assumptions inherent in the present data used by the model.)

In the first study on penitentiary admissions, the CANJUS model was used to predict admissions by Warrant of Committal (W/C) upon conviction and W/C upon forfeiture in 1974; to this figure an estimated count of parole and mandatory supervision revocations, using simple extrapolation procedures, was added.

The basic method used for this initial prediction included:

- i) an estimate of the number of offences committed in 1974 (converted to number of offenders entering Stage 1 of the flow model for 21 different crime types);
- ii) an assumption that the branching ratios remained constant for the system between 1970 and 1974 (the branching ratio is defined as the percentage of persons who flow from one stage to the next). Based on these two factors, the model calculated the number of individuals who would flow into correctional

institutions in 1974. (See reference (7) for a full description of procedures and results of this first study.)

The purpose of this paper, then, is to expand upon the method initially used for the prediction. It is our intention to change the data base of branching ratios in the stages from 1970 so as to reflect trends in these figures over the last four or five years as this would provide more realistic input upon which to base the prediction. The factors to be examined as possible influences upon penitentiary admissions and population are:

- police apprehension activities (clearance rates);
- sentencing variations;
- release patterns (parole rates);
- time served.

The next section of the paper provides the methodology and results of the above sensitivity tests. The final section draws some conclusions on this penitentiary population prediction.

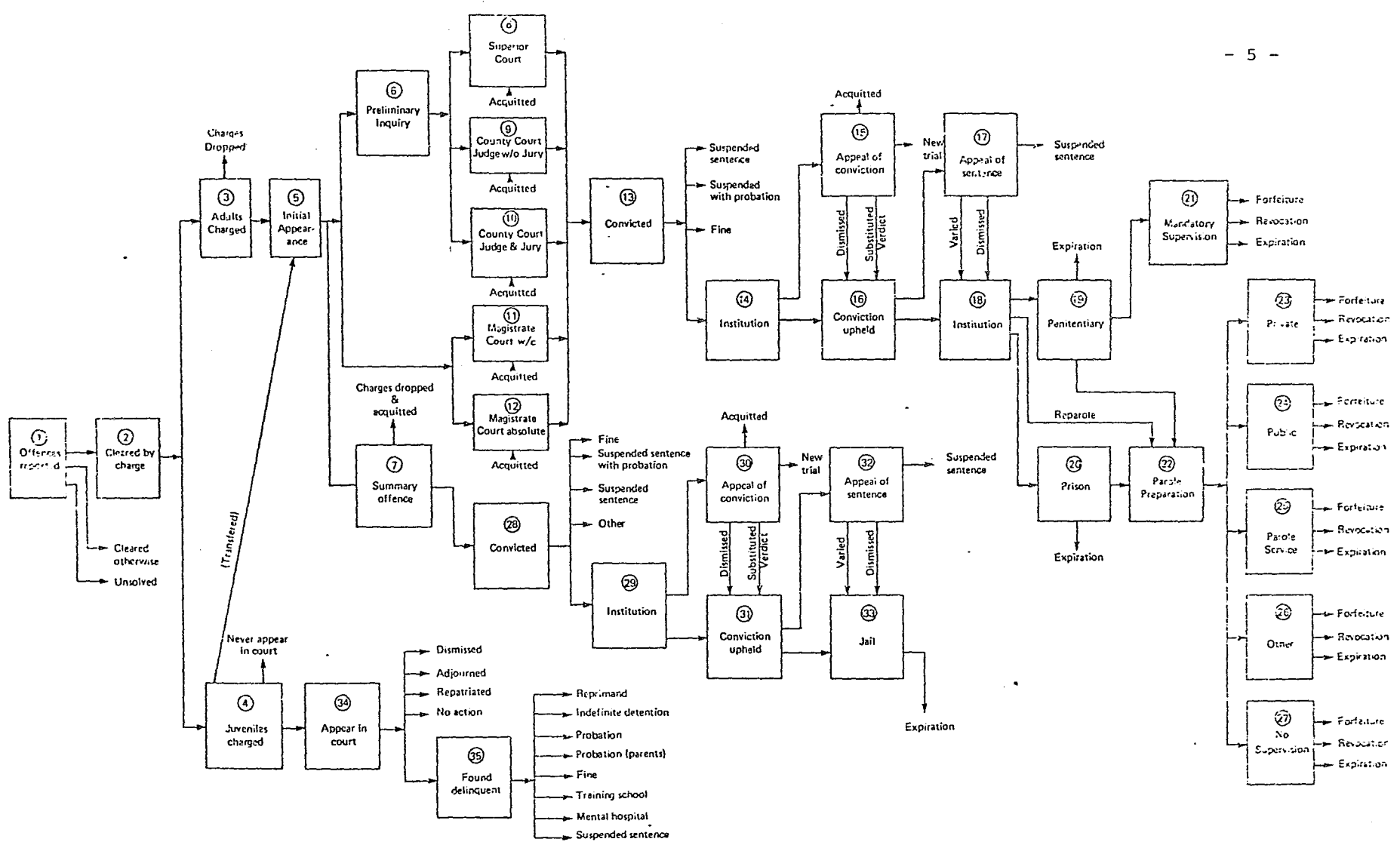
II

METHODOLOGY FOR SENSITIVITY ANALYSES

The CANJUS model is a linear model which gives a quantitative description of the costs, workloads, resources and flows of persons at the various stages in the C.C.J.S. A diagram of this model is presented in Figure 1. For predicting admissions only the flow variable values are necessary; however, for predicting the penitentiary population, workloads are used.

As opposed to the earlier study which inputted data (in terms of offences reported) at Stage 1 of the CANJUS model, this prediction commenced with Stage 3 - Adults Charged ^{1/}. These data for 1968 to 1972 were taken from the "Crime Statistics" publications of Statistics Canada. Based on these years, the average percentage change in charges made for each crime type was calculated (Table 1A). Using the average percentage change of these four years, an estimated number of adults charged for each crime type in 1973 and 1974 was calculated. The results of this estimation can be seen in Table 1B. By using these estimates and keeping the branching ratios (based on the average for 1970 and 1971),

^{1/} The reason for using stage 3 instead of stage 1 is that the data presently available is more reliable in stage 3.



Flow diagram: Canadian Criminal Justice System

TABLE 1A
ADULTS CHARGED

| OFFENCE TYPE | 1968 | 1969 | % change '68-'69 | 1970 | % change '69-'70 | 1971 | % change '70-'71 | 1972 | % change '71-'72 | Average % change '68-'72 |
|--------------------------|--------|--------|---------------------|--------|---------------------|--------|---------------------|--------|---------------------|--------------------------------|
| Murder | 235 | 260 | 10.6 | 296 | 13.8 | 351 | 18.5 | 376 | 7.1 | 12.5 |
| Attempted Murder | 123 | 178 | 44.7 | 215 | 20.7 | 268 | 24.6 | 329 | 22.7 | 28.18 |
| Manslaughter | 50 | 40 | -20.0 | 35 | -12.5 | 45 | 28.5 | 40 | -11.1 | - 3.78 |
| Rape | 598 | 728 | 21.7 | 637 | -12.5 | 688 | 8.0 | 695 | 1.0 | 4.55 |
| Other Sexual Offences | 3,000 | 3,043 | 1.4 | 3,162 | 3.9 | 3,072 | - 2.8 | 2,710 | -11.7 | - 2.30 |
| Wounding | 613 | 635 | 3.5 | 698 | 9.9 | 758 | 8.5 | 878 | 15.8 | 9.43 |
| Assaults | 22,153 | 23,491 | 6.0 | 25,576 | 8.8 | 27,058 | 5.7 | 27,986 | 3.4 | 5.98 |
| Robbery | 2,930 | 3,038 | 3.6 | 3,605 | 18.6 | 3,618 | 0.3 | 3,723 | 2.9 | 6.35 |
| Breaking & Entering | 16,755 | 18,377 | 9.6 | 20,417 | 11.1 | 21,523 | 5.4 | 21,616 | 0.4 | 6.63 |
| Theft - Motor Vehicle | 7,652 | 8,120 | 6.1 | 8,575 | 5.6 | 8,727 | 1.7 | 9,761 | 11.8 | 6.30 |
| Theft | 32,810 | 36,947 | 12.6 | 45,500 | 23.1 | 49,301 | 8.3 | 50,938 | 3.3 | 11.83 |
| Have Stolen Goods | 5,303 | 6,199 | 16.8 | 7,252 | 16.9 | 8,242 | 13.6 | 8,524 | 3.4 | 12.68 |
| Fraud | 12,255 | 14,103 | 15.0 | 16,149 | 14.5 | 16,796 | 4.0 | 17,354 | 3.3 | 9.20 |
| Prostitution | 1,994 | 2,068 | 3.7 | 1,879 | - 9.1 | 1,996 | 6.2 | 2,076 | 4.0 | 1.20 |
| Gaming & Betting | 2,560 | 3,049 | 19.1 | 3,035 | - 0.4 | 3,116 | 2.6 | 3,523 | 13.0 | 8.58 |
| Offensive Weapons | 3,239 | 3,751 | 15.8 | 4,384 | 16.8 | 4,398 | 0.3 | 4,713 | 7.1 | 10.00 |

TABLE 1A

ADULTS CHARGED

| OFFENCE TYPE | 1968 | 1969 | % change '68-'69 | 1970 | % change '69-'70 | 1971 | % change '70-'71 | 1972 | % change '71-'72 | Average % Change '68-'72 |
|--------------------------|-----------|-----------|---------------------|-----------|---------------------|-----------|---------------------|-----------|---------------------|--------------------------------|
| Other Criminal Code* | 119,651 | 123,242 | 3.0 | 155,172 | 25.9 | 172,400 | 11.1 | 118,910 | -31.02 | 2.25 |
| Narcotic Control Act | 2,809 | 4,623 | 64.5 | 9,822 | 112.4 | 12,597 | 28.2 | 21,209.57 | 68.37 | 68.37 |
| Other Federal Statutes** | 36,823 | 37,096 | 0.74 | 26,899 | -27.48 | 28,139 | 4.6 | 28,078 | 0.21 | 5.48 |
| Provincial Statutes | 2,249,658 | 2,281,665 | 1.42 | 2,107,381 | - 7.63 | 2,097,320 | - 0.47 | 2,366,508 | 12.83 | - 1.64 |
| Municipal By-Laws | 415,153 | 432,809 | 4.25 | 455,920 | 5.33 | 542,514 | 18.99 | 472,225 | -12.95 | 7.11 |

* Except arson

** Except arson

SOURCE: Statistics Canada, Cat. No. 85-205
 PREPARED BY: Statistics Division, Ministry Secretariat

TABLE 1B

ADULTS CHARGED

| OFFENCE TYPE | ESTIMATE 1973 | ESTIMATE 1974 |
|------------------------|------------------|------------------|
| Murder | 423 | 476 |
| Attempted Murder | 422 | 541 |
| Manslaughter | 39 | 37 |
| Rape | 727 | 760 |
| Other Sexual Offences | 2,648 | 2,587 |
| Wounding | 961 | 1,051 |
| Assaults | 29,660 | 31,433 |
| Robbery | 3,959 | 4,211 |
| Breaking & Entering | 23,049 | 24,501 |
| Theft - Motor Vehicle | 10,376 | 11,030 |
| Theft | 56,964 | 63,703 |
| Have Stolen Goods | 9,605 | 10,823 |
| Fraud | 18,951 | 20,694 |
| Prostitution | 2,101 | 2,126 |
| Gaming & Betting | 3,825 | 4,154 |
| Offensive Weapons | 5,184 | 5,703 |
| Other Criminal Code | 122,989 | 127,207 |
| Narcotic Control Act | 23,331 | 25,664 |
| Other Federal Statutes | 27,199 | 26,348 |
| Provincial Statutes | 2,308,055 | 2,251,046 |
| Municipal By-Laws | 445,639 | 420,549 |

NOTE: For Narcotic Control Act, we applied an average change of +10% because it was felt that the average 68% increase from 1968-1972 would not be sustained.

constant for 1972, 1973 and 1974 (as in the earlier study), the model estimated the number of penitentiary admissions by crime type (Table 2). The results of changing this one parameter (level of flows or in this case, adults charged) in the system produced a decrease of 896 admissions from the predicted 5,079 found in the earlier study. (See reference (7), Table 5.)

The next phase of these sensitivity analyses involved changing the branching ratio for persons entering the penitentiary stage as opposed to the prison stage. In the earlier study, the branching ratio for 1974 was estimated by averaging those of 1970 and 1971. In this analysis, we used the average annual change in penitentiary admissions between 1968-1971 to estimate by extrapolation the branching ratio to be applied to 1972, 1973 and finally to 1974. Table 3A shows admissions to the penitentiary by warrant of commitment upon conviction and forfeiture between 1968 and 1971. The new branching ratios by crime type are shown in Table 3B.

We then applied these new branching ratios along with the expected crime rate for 1974 (as measured in adults charged) to the CANJUS model; the resultant effect upon penitentiary admissions is seen in Table 4. The number of predicted admissions differs from that produced in Table 2

TABLE 2
ESTIMATED ADMISSIONS TO PENITENTIARY,
1973 and 1974*

| OFFENCE TYPE | ESTIMATE 1973 | ESTIMATE 1974 |
|--------------------------|------------------|------------------|
| Murder | 98 | 110 |
| Attempted Murder | 10 | 13 |
| Manslaughter | 32 | 31 |
| Rape | 72 | 75 |
| Other Sexual Offences | 83 | 81 |
| Wounding | 107 | 117 |
| Assaults | 136 | 145 |
| Robbery | 780 | 830 |
| Breaking & Entering | 865 | 919 |
| Theft of Motor Vehicle** | - | - |
| Theft | 446 | 499 |
| Have Stolen Goods | 206 | 232 |
| Fraud | 394 | 430 |
| Prostitution | 9 | 9 |
| Gaming & Betting*** | - | - |
| Offensive Weapons | 70 | 77 |
| Other Criminal Code | 232 | 239 |
| Narcotic Control Act | 334 | 367 |
| Federal Statutes | 10 | 9 |
| Provincial Statutes | - | - |
| Municipal By-Laws | - | - |
| TOTAL | 3,884 | 4,183 |

* Warrant of Commitment upon conviction and W/C upon forfeiture.

** Included with Theft.

*** Included with Other Criminal Code.

TABLE 3A

ADMISSIONS TO PENITENTIARIES (INCLUDING W/C AND FORFEITURE)

| CRIME TYPE | 1968-69 | 1969 | 68-69 % change | 1970 | 69-70 % change | 1971 | 70-71 % change | Average % change 68-71 | Estimated 1972 |
|-------------------|---------|-------|-------------------|-------|-------------------|-------|-------------------|---------------------------|-------------------|
| Municipal By-Laws | - | - | - | - | - | - | - | - | - |
| TOTAL | 3,663 | 3,974 | 8.49 | 4,249 | 6.92 | 4,073 | - 4.14 | 3.76 | 4,226.14 |
| Revocations | 149 | 155 | 4.03 | 224 | 44.52 | 310 | 38.39 | 28.98 | 399.84 |
| GRAND TOTAL | 3,812 | 4,129 | 8.32 | 4,473 | 8.33 | 4,383 | - 2.01 | 4.88 | 4,596.89 |

SOURCE: Statistics Canada, Correctional Institution Statistics

TABLE 3B
 PERCENTAGE OF PERSONS ADMITTED TO PENITENTIARY AND
 PRISONS UPON CONVICTION FOR INDICTABLE OFFENCES

| OFFENCE TYPE | % TO PENITENTIARY | % TO PRISON |
|---------------------------|----------------------|----------------|
| Murder | 100.00 | 0.00 |
| Attempted Murder | 100.00 | 0.00 |
| Manslaughter | 100.00 | 0.00 |
| Rape | 100.00 | 0.00 |
| Other Sexual Offences | 32.87 | 67.13 |
| Wounding | 39.46 | 60.54 |
| Assaults | 6.93 | 93.07 |
| Robbery | 69.70 | 30.30 |
| Breaking & Entering | 20.18 | 79.82 |
| Theft - Motor Vehicle* | - | - |
| Theft | 6.36 | 93.64 |
| Have Stolen Goods | 10.56 | 89.44 |
| Fraud | 14.90 | 85.10 |
| Prostitution | 8.56 | 91.44 |
| Gaming & Betting | 0.00 | 100.00 |
| Offensive Weapons | 16.06 | 83.94 |
| Other Criminal Code | 19.94 | 80.06 |
| Narcotic Control Act | 17.00 | 83.00 |
| Other Federal Statutes | 1.64 | 98.36 |

* Included with Theft.

TABLE 4

PREDICTED PENITENTIARY ADMISSIONS, 1974

| OFFENCE TYPE | NUMBER OF ADMISSIONS | CHANGE FROM TABLE 2 |
|--------------------------|----------------------|---------------------|
| Murder | 110 | |
| Attempted Murder | 13 | |
| Manslaughter | 31 | |
| Rape | 85 | +10 |
| Other Sexual Offences | 129 | +48 |
| Wounding | 101 | -16 |
| Assaults | 144 | - 1 |
| Robbery | 1,000 | +170 |
| Breaking & Entering | 1,173 | +254 |
| Theft - Motor Vehicle* | - | - |
| Theft | 554 | +55 |
| Have Stolen Goods | 244 | +12 |
| Fraud | 488 | +58 |
| Prostitution & Procuring | 7 | - 2 |
| Gaming & Betting** | - | - |
| Offensive Weapons | 89 | +12 |
| Other Criminal Code | 331 | +92 |
| Narcotic Control Act | 339 | -28 |
| Other Federal Statutes | 7 | - 2 |
| TOTAL | 4,845 | +662 |

* Included with Theft.

** Included with Other Criminal Code.

because we have now simultaneously manipulated two parameters in the C.C.J.S. - flows through the system (number of adults charged) and branching ratios (the sentencing variations between the levels of institutions).

While the prediction of admissions does provide some quantitative estimate of the penitentiaries' inmate populations, the estimates by themselves do not provide the line agencies with enough information for their program budget forecast. More information is needed on the actual number of inmate years expected in the institutions. To this end we have used the CANJUS model to predict the actual penitentiary population in 1974 utilizing the workload parameter of this model. The penitentiary workload is defined as the average length of a sentence served from the time the individual enters the penitentiary until the time he is released by one of the following methods: expiration of sentence, mandatory supervision or parole supervision. In effect then, we have two workloads for a penitentiary:

- 1) expiration - mandatory supervision, and
- 2) parole.

It would then be correct to say that the penitentiary population is composed of two groups of people expected to serve varying amounts of time. The difficulty is, that at the point of admission, (with a few exceptions such as habitual offenders) the C.P.S. does not know which path a particular inmate will follow - whether to expiry of sentence or parole release. To equalize this situation, one can calculate the proportions released on parole or expiry by offence type over the past few years to establish a basic trend, and then one can calculate the average (mean) time served by offence prior to this release. The CANJUS model is programmed to apply these two estimated variables (admissions to penitentiary and the two types of workloads) to calculate the penitentiary resources (in terms of inmate man years) that are required for supervision of these persons.

The following formula shows how the CANJUS model calculates the estimated penitentiary population in 1974:

MTS = Mean Time Served

A-Par = Number of Admissions expected to
be released on parole

A-Exp = number of Admissions expected to be released at expiry of sentence

$$\text{MTS} \times \% \text{ A-Par} + \text{MTS} \times \% \text{ A-Exp} = \text{Penitentiary Population}$$

Table 5 exhibits the mean time served for persons released at expiry or on parole for 1968-1969 to 1971. Table 6 shows the proportion of total releases that are expirations and paroles for this same time period. Applying the averages of the extrapolated values of these variables, CANJUS predicted the 1972, 1973 and 1974 penitentiary population. The distribution of the total expected 9,491 inmates in 1974 in the penitentiaries is shown on Table 7.

However, this number excludes persons in the institution for parole revocation. Using a simple extrapolation method we can estimate that there will be 665 persons admitted to penitentiary on parole revocation. Then, by using the workload of approximately one year, based on 1968 to 1971 we multiply this figure by the admittances to get an estimated parole revocation population. The result is 665. Adding these parole revocations to the previous expected number of inmates we get a total population of 10,156.

TABLE 5
PAROLE

| OFFENCE TYPE | MEAN TIME SERVED (IN YEARS)* | | | | | | | | |
|-----------------------------|------------------------------|------|---------------------|------|---------------------|-------|---------------------|----------------------|--------------------------|
| | '68-'69 | '69 | % change '68-'69 | '70 | % change '69-'70 | '71 | % change '70-'71 | Avg. Mean '68-'71 | Avg. % change '68-'71 |
| Murder | 10.89 | 8.69 | -20.20 | 6.73 | -22.55 | 10.33 | 53.49 | 9.16 | 3.58 |
| Attempted Murder | 6.16 | 3.49 | -43.34 | 6.12 | 75.35 | 4.13 | -32.51 | 4.98 | -0.17 |
| Manslaughter | 3.02 | 3.75 | 24.17 | 2.71 | -27.73 | 2.62 | - 3.32 | 3.03 | -2.29 |
| Rape | 1.68 | 1.84 | 9.52 | 1.67 | - 9.23 | 1.51 | - 9.58 | 1.68 | - 3.10 |
| Other Sexual Offences | 0.84 | 1.55 | 84.52 | 1.37 | -11.61 | 1.51 | 10.21 | 1.32 | 27.71 |
| Wounding | 1.73 | 1.90 | 9.82 | 2.50 | 31.57 | 1.52 | -39.20 | 1.91 | 0.73 |
| Assaults | 1.22 | 1.14 | - 6.55 | 1.03 | - 9.64 | 1.04 | 0.97 | 1.11 | - 5.07 |
| Robbery | 2.43 | 2.26 | - 6.99 | 2.02 | -10.61 | 1.82 | - 9.90 | 2.13 | - 9.17 |
| Breaking & Entering | 1.42 | 1.49 | 4.92 | 1.25 | -16.10 | 1.15 | - 8.00 | 1.33 | - 6.39 |
| Theft | 1.37 | 1.30 | - 5.10 | 1.10 | -15.38 | 1.01 | - 8.18 | 1.20 | - 9.55 |
| Have Stolen Goods | 1.41 | 1.47 | 4.25 | 1.20 | -18.36 | 1.34 | 11.66 | 1.36 | - 0.82 |
| Fraud | 1.59 | 1.42 | -10.69 | 1.21 | -14.78 | 1.11 | - 8.26 | 1.33 | -11.24 |
| Prostitution & Procuring | 1.00 | 1.16 | 16.00 | 2.10 | 81.03 | 0.50 | -76.19 | 1.19 | 6.95 |
| Offensive Weapons | 2.30 | 1.19 | -48.26 | 1.16 | - 2.52 | 1.00 | -13.79 | 1.41 | -21.52 |

TABLE 5

PAROLE

| OFFENCE TYPE | MEAN TIME SERVED (IN YEARS)* | | | | | | | | |
|---------------------------|------------------------------|------|---------------------|------|---------------------|------|---------------------|----------------------|--------------------------|
| | '68-'69 | '69 | % change '68-'69 | '70 | % change '69-'70 | '71 | % change '70-'71 | Avg. Mean '68-'71 | Avg. % change '68-'71 |
| Other Criminal Code** | 2.05 | 1.81 | -11.70 | 1.89 | 4.41 | 1.61 | -14.81 | 1.84 | - 7.37 |
| Narcotic Control Act | 1.88 | 1.79 | - 4.78 | 1.52 | -15.08 | 0.74 | -51.31 | 1.48 | -23.72 |
| Other Federal Statutes | 1.62 | 1.33 | -17.90 | 1.50 | 12.78 | 1.50 | 0.0 | 1.49 | - 1.71 |
| Parole Revocations | 1.67 | 3.35 | 100.59 | 2.03 | -39.40 | 1.34 | -33.99 | 2.10 | 9.07 |

* Males only

** Includes Traffic Offences under the Criminal Code, prison breach, habitual criminals and dangerous sexual offenders.

SOURCE: Statistics Canada, Correctional Institution Statistics

TABLE 5
EXPIRATIONS

| OFFENCE TYPE | MEAN TIME SERVED (IN YEARS)* | | | | | | | | |
|-----------------------------|------------------------------|------|---------------------|------|---------------------|------|---------------------|--------------|--------------------------|
| | '68-'69 | '69 | % change '68-'69 | '70 | % change '69-'70 | '71 | % change '70-'71 | Avg. '68-'71 | Avg. % change '68-'71 |
| Murder | - | 0.50 | - | - | - | - | - | - | - |
| Attempted Murder | 7.62 | 8.75 | 14.82 | 5.16 | -41.03 | 5.00 | - 3.10 | 6.63 | - 9.77 |
| Manslaughter | 5.29 | 4.38 | -17.20 | 4.38 | 0.00 | 4.40 | 00.45 | 4.61 | - 5.58 |
| Rape | 3.99 | 3.61 | - 9.52 | 4.30 | 19.11 | 3.26 | -24.18 | 3.79 | - 4.86 |
| Other Sexual Offences | 2.48 | 2.45 | - 1.20 | 2.64 | 7.76 | 2.45 | - 7.19 | 2.51 | - 0.21 |
| Wounding | 2.96 | 1.97 | -33.44 | 2.78 | 41.12 | 2.07 | -25.53 | 2.45 | - 5.95 |
| Assaults | 1.49 | 1.61 | 8.05 | 1.71 | 6.21 | 2.64 | 54.38 | 1.86 | 22.88 |
| Robbery | 3.10 | 3.29 | 6.12 | 2.89 | -12.16 | 3.17 | 9.68 | 3.11 | 1.21 |
| Breaking & Entering | 2.14 | 2.13 | -00.46 | 2.07 | - 2.82 | 2.19 | 5.79 | 2.13 | 0.84 |
| Theft | 1.81 | 1.71 | - 5.52 | 1.78 | 4.09 | 1.77 | - 0.56 | 1.77 | - 0.66 |
| Have Stolen Goods | 1.89 | 1.98 | 4.76 | 2.07 | 4.55 | 1.64 | -20.77 | 1.90 | - 3.82 |
| Fraud | 2.01 | 1.97 | - 1.99 | 1.96 | -00.51 | 1.87 | - 4.59 | 1.95 | - 2.36 |
| Prostitution & Procuring | 1.80 | 1.50 | -16.67 | 2.21 | 47.33 | 1.70 | -23.07 | 1.80 | 2.53 |
| Offensive Weapons | 2.36 | 2.34 | -00.84 | 1.94 | -17.09 | 2.10 | 8.24 | 2.19 | - 3.23 |
| Other Criminal Code** | 1.81 | 1.91 | 5.52 | 2.08 | 8.90 | 2.22 | 6.73 | 2.01 | 7.05 |

TABLE 5
EXPIRATIONS

| OFFENCE TYPE | MEAN TIME SERVED (IN YEARS)* | | | | | | | | |
|---------------------------|------------------------------|------|---------------------|------|---------------------|------|---------------------|--------------|--------------------------|
| | '68-'69 | '69 | % change '68-'69 | '70 | % change '69-'70 | '71 | % change '70-'71 | Avg. '68-'71 | Avg. % change '68-'71 |
| Narcotic Control Act | 2.46 | 2.30 | - 6.50 | 2.78 | 20.87 | 2.35 | -15.46 | 2.47 | - 0.36 |
| Other Federal Statutes | 2.27 | 1.94 | -14.53 | 1.90 | - 2.06 | 1.50 | -21.05 | 1.90 | -12.55 |
| Parole Revocations | 0.96 | 1.22 | 27.08 | 1.10 | - 9.84 | 0.82 | -25.45 | 1.03 | - 2.74 |

* Males only

** Includes traffic offences under the Criminal Code, prison breach, habitual criminals and dangerous sexual offenders.

SOURCE: Statistics Canada, Corrections Institution Statistics

TABLE 6

PAROLE AS PERCENTAGE OF TOTAL RELEASES

| OFFENCE TYPE | 1968/69 | 1969 | Change '68-'69 | 1970 | Change '69-'70 | 1971 | Change '70-'71 | Avg. '68-'71 | Avg. Change '68-'71 |
|-----------------------------|---------|-------|-------------------|--------|-------------------|--------|-------------------|--------------|------------------------|
| Murder | 100.00 | 95.83 | - 4.17 | 100.00 | 4.17 | 100.00 | 0.00 | 98.96 | 0.00 |
| Attempted Murder | 52.94 | 63.63 | 10.69 | 72.73 | 9.10 | 73.33 | 0.60 | 65.66 | 6.80 |
| Manslaughter | 66.67 | 75.00 | 8.33 | 78.20 | 3.20 | 70.59 | - 7.61 | 72.62 | 1.31 |
| Rape | 57.14 | 84.48 | 27.34 | 80.77 | - 3.71 | 70.00 | -10.77 | 73.10 | 4.29 |
| Other Sexual Offences | 39.07 | 44.00 | 4.93 | 62.68 | 18.68 | 56.55 | - 6.13 | 50.58 | 5.83 |
| Wounding | 47.22 | 46.52 | - 0.70 | 57.62 | 11.10 | 59.38 | 1.76 | 52.69 | 4.05 |
| Assaults | 18.64 | 24.15 | 5.51 | 47.44 | 23.29 | 50.00 | 2.56 | 35.06 | 10.45 |
| Robbery | 50.42 | 60.07 | 9.65 | 69.75 | 9.68 | 70.09 | 0.34 | 62.58 | 6.56 |
| Breaking & Entering | 39.17 | 44.19 | 5.02 | 62.71 | 18.52 | 61.58 | - 1.13 | 51.91 | 7.47 |
| Theft | 34.39 | 40.86 | 6.47 | 59.82 | 18.96 | 54.76 | - 5.06 | 47.46 | 6.79 |
| Have Stolen Goods | 36.36 | 35.30 | - 1.06 | 57.54 | 22.24 | 58.66 | 1.12 | 46.97 | 7.43 |
| Fraud | 40.61 | 48.70 | 8.09 | 56.69 | 7.99 | 61.84 | 5.15 | 51.96 | 7.08 |
| Prostitution & Procuring | 16.67 | 30.00 | 13.33 | 58.82 | 28.82 | 28.57 | -30.25 | 33.52 | 3.97 |
| Offensive Weapons | 41.67 | 40.62 | - 1.05 | 51.42 | 9.80 | 50.00 | - 1.42 | 45.93 | 3.14 |
| Other Criminal Code | 38.32 | 41.29 | 2.97 | 56.12 | 14.83 | 63.24 | 7.12 | 49.74 | 8.31 |
| Narcotic Control Act | 50.63 | 55.17 | 4.54 | 73.26 | 18.09 | 75.13 | 1.87 | 63.55 | 8.17 |
| Other Federal Statutes | 25.00 | 40.00 | 15.00 | 61.53 | 21.53 | 83.33 | 21.80 | 52.47 | 19.44 |
| Parole Revocation | 16.04 | 16.81 | 0.77 | 29.45 | 12.64 | 32.60 | 3.15 | 23.73 | 5.52 |

SOURCE: Statistics Canada, Correctional Institution Statistics

TABLE 6

EXPIRATION AS PERCENTAGE OF TOTAL RELEASES

| OFFENCE TYPE | 1968/69 | 1969 | Change '68-'69 | 1970 | Change '69-'70 | 1971 | Change '70-'71 | Avg. '68-'71 | Average change '68-'71 |
|-----------------------------|---------|-------|-------------------|-------|-------------------|-------|-------------------|--------------|---------------------------|
| Murder | 0.00 | 4.16 | 4.16 | 0.00 | - 4.16 | 0.00 | | - | 0 |
| Attempted Murder | 47.06 | 36.37 | -10.69 | 27.27 | - 9.10 | 26.27 | - .6 | 34.34 | - 6.8 |
| Manslaughter | 33.33 | 25.00 | - 8.33 | 21.80 | - 3.2 | 29.41 | 7.61 | 27.39 | - 1.3 |
| Rape | 42.86 | 15.52 | -27.34 | 19.23 | 3.71 | 30.00 | 10.77 | 26.90 | - 4.29 |
| Other Sexual Offences | 60.93 | 56.00 | - 4.93 | 37.32 | -18.68 | 43.45 | 6.13 | 49.43 | - 5.83 |
| Wounding | 52.78 | 53.48 | .7 | 42.38 | -11.1 | 40.63 | - 1.75 | 47.32 | - 4.05 |
| Assaults | 81.36 | 75.86 | - 5.5 | 52.77 | -23.09 | 50.00 | - 2.77 | 65.00 | -10.45 |
| Robbery | 49.58 | 39.93 | - 9.65 | 30.25 | - 9.68 | 29.91 | - .34 | 37.42 | - 6.56 |
| Breaking & Entering | 60.83 | 55.81 | - 5.02 | 37.29 | -18.52 | 38.42 | 1.13 | 48.09 | - 7.47 |
| Theft | 65.61 | 59.14 | - 6.47 | 40.18 | -18.96 | 45.24 | 5.06 | 52.54 | - 6.79 |
| Have Stolen Goods | 63.64 | 64.70 | 1.06 | 42.46 | -22.24 | 41.34 | - 1.12 | 53.04 | - 7.43 |
| Fraud | 59.39 | 51.30 | - 8.09 | 43.31 | - 7.99 | 38.16 | - 5.15 | 48.04 | - 7.08 |
| Prostitution & Procuring | 83.33 | 70.00 | -13.33 | 41.18 | -28.82 | 71.43 | 30.25 | 66.49 | - 3.97 |
| Offensive Weapons | 58.33 | 59.37 | 1.04 | 48.57 | -10.8 | 50.00 | 1.43 | 54.07 | - 2.78 |
| Other Criminal Code | 61.68 | 58.71 | - 2.97 | 43.88 | -14.83 | 36.76 | - 7.12 | 50.26 | - 8.31 |
| Narcotic Control Act | 49.37 | 44.83 | - 4.54 | 26.73 | -18.1 | 24.87 | - 1.86 | 36.45 | - 8.16 |
| Other Federal Statutes | 75.00 | 60.00 | -15.0 | 38.47 | -21.53 | 16.67 | -21.80 | 47.54 | -19.44 |
| Parole Revocation | 83.96 | 83.19 | - 0.77 | 70.55 | -12.64 | 67.40 | - 3.15 | 76.28 | - 5.52 |

SOURCE: Statistics Canada, Correctional Institution Statistics

TABLE 7

PREDICTED PENITENTIARY POPULATION, 1974

| OFFENCE TYPE | INMATES EXPECTED TO BE RELEASED ON EXPIRY | INMATES EXPECTED TO BE RELEASED ON PAROLE | TOTAL PENITENTIARY POPULATION |
|------------------------|---|---|----------------------------------|
| Murder | 553 | 519 | 1,072 |
| Attempted Murder | 35 | 38 | 73 |
| Manslaughter | 39 | 68 | 107 |
| Rape | 70 | 112 | 182 |
| Other Sexual Offences | 136 | 99 | 235 |
| Wounding | 176 | 55 | 231 |
| Assaults | 21 | 147 | 168 |
| Robbery | 832 | 1,561 | 2,393 |
| Breaking & Entering | 592 | 1,191 | 1,783 |
| Theft | 244 | 499 | 743 |
| Have Stolen Goods | 108 | 255 | 363 |
| Fraud | 340 | 417 | 757 |
| Prostitution | 1 | 8 | 9 |
| Offensive Weapons | 110 | 55 | 165 |
| Other Criminal Code | 290 | 344 | 634 |
| Narcotic Control Act | 158 | 407 | 565 |
| Other Federal Statutes | - | 11 | 11 |
| TOTAL | 3,705 | 5,786 | 9,491 |

As a further sensitivity test, it was decided to see what effect police apprehension activities (i.e., the percentage of persons cleared by charge) had upon penitentiary admissions and penitentiary population in 1974. The 17 criminal code offences were grouped together (refer to Appendix A for details of these offences) for this test. The average change between 1968-1971 was applied to the 1970 data base to estimate the expected change in 1974 clearance rates:

Average Change in Clearance Rates, 1968-1971

| | |
|------------------------|---------|
| Criminal Code | + 0.26% |
| Narcotic Control Act | + 5.38% |
| Other Federal Statutes | - 4.01% |

At the same time we decide to examine sentencing patterns in the 1968-1971 period to see if there had been any variation in the proportion of people being sentenced to an institutional term as opposed to receiving a fine, or suspended sentence/probation. Again, the 17 Criminal Code offence types were compiled into one crime group (see Table 8).

TABLE 8

PERCENTAGES OF THE NUMBER OF PERSONS SENTENCED TO INSTITUTION COMPARED TO THE NUMBER OF PERSON CONVICTED

| | 1968 | 1969 | Change '68-'69 | 1970 | Change '69-'70 | 1971 | Change '70-'71 | Average Change |
|---------------------------|---|-------|-------------------|-------|-------------------|-------|-------------------|-------------------|
| CRIMINAL CODE | 41.65 | 39.14 | - 2.51 | 35.79 | - 3.35 | 27.77 | - 8.02 | - 4.62 |
| NARCOTIC CONTROL ACT | 62.55 | 48.92 | -13.62 | 41.36 | - 7.56 | 46.59 | 5.23 | - 5.32 |
| OTHER FEDERAL STATUTES | NUMBERS ARE TOO SMALL TO HAVE ANY MEANING | | | | | | | |

SOURCE: Statistics Canada, Statistics of Criminal and
Other Offences

Thus, two more changes in the stages of the
model -

- i) at stage 2 - the branching ratios of persons cleared by charge, and
- ii) at stage 13 - the branching ratios of the disposition of adults convicted of indictable offences

were simultaneously introduced to calculate the effect upon penitentiary admissions and penitentiary population (inmate man years) in 1974. The results of this cumulative analysis are shown in Table 9. (The penitentiary parole revocation population was left unchanged because these persons re-enter the penitentiary rather than re-enter at stage 1.)

TABLE 9
PREDICTED PENITENTIARY ADMISSIONS AND
PENITENTIARY POPULATION, 1974

| CRIME GROUP | 1974 ADMISSIONS | PENITENTIARY POPULATION | | |
|---------------------------|--------------------|-------------------------|--------|-------|
| | | PAROLE | EXPIRY | TOTAL |
| Criminal Code | 3,905 | 4,658 | 3,078 | 7,736 |
| Narcotic Control Act | 290 | 348 | 135 | 483 |
| Other Federal Statutes | 7 | 11 | - | 11 |
| TOTAL | 4,202 | 5,017 | 3,213 | 8,230 |

III

CONCLUSION

Before making a conclusion on the results of this second penitentiary admission and population prediction paper, it seems important to first of all summarize the predictions and results that were produced in the previous section.

In viewing these summaries it should be noted that each test was based on the previous test. That is, prediction #2 used prediction #1 changes and prediction #3 was also based on prediction #1 and #2. In the first test we simply input the expected number of adults charged in 1974. This expected number of adults charged was based on an average percentage change over the years 1968 to 1972. Using an extrapolation method the average changes for each crime type were found and applied to the 1972 figures and then to the estimated 1973 figures. Using this as input the computer calculated the estimated 4,848 admissions (including parole revocations) to penitentiaries for 1974. (These results can be seen in Table 10 under prediction #1.)

The purpose of prediction #2 was to find the estimated penitentiary population for 1974. It should be noted that prediction #1 was used as a base for the changes

TABLE 10

SUMMARY PREDICTIONS OF PENITENTIARY ADMISSIONS AND POPULATION, 1974

| OFFENCE TYPE | 1974 ADMISSIONS | | 1974 POPULATION |
|------------------------|-----------------|---------------|-----------------|
| | Prediction #1 | Prediction #2 | Prediction #2 |
| Murder | 110 | 110 | 1,072 |
| Attempted Murder | 13 | 13 | 73 |
| Manslaughter | 31 | 31 | 107 |
| Rape | 75 | 85 | 182 |
| Other Sexual Offences | 81 | 129 | 235 |
| Wounding | 117 | 101 | 231 |
| Assaults | 145 | 144 | 168 |
| Robbery | 830 | 1,000 | 2,393 |
| Breaking & Entering | 919 | 1,173 | 1,783 |
| Theft - Motor Vehicle* | - | - | - |
| Theft | 499 | 554 | 743 |
| Have Stolen Goods | 232 | 244 | 363 |
| Fraud | 430 | 488 | 757 |
| Prostitution | 9 | 7 | 9 |
| Gaming & Betting** | - | - | - |
| Offensive Weapons | 77 | 89 | 165 |
| Other Criminal Code | 239 | 331 | 634 |

TABLE 10

SUMMARY PREDICTIONS OF PENITENTIARY ADMISSIONS AND POPULATION, 1974

| OFFENCE TYPE | 1974 ADMISSIONS | | | 1974 POPULATION | |
|----------------------|-----------------|---------------|---------------|-----------------|---------------|
| | Prediction #1 | Prediction #2 | Prediction #3 | Prediction #2 | Prediction #3 |
| TOTAL C.C. | 3,807 | 4,499 | 3,905 | 8,915 | 7,736 |
| Narcotic Control Act | 367 | 339 | 290 | 565 | 483 |
| Federal Statutes | 9 | 7 | 7 | 11 | 11 |
| Provincial Statutes | - | - | - | - | - |
| Municipal By-Laws | - | - | - | - | - |
| TOTAL | 4,183 | 4,845 | 4,202 | 9,491 | 8,230 |
| Parole Revocations | 665 | 665 | 665 | 665 | 665 |
| TOTAL | 4,848 | 5,510 | 4,867 | 10,156 | 8,895 |

* Included with "Theft".

** Included with "Other Criminal Code".

we made here. There were two parameters changed in this test. The first one was the branching ratios for the persons released from the penitentiary. Our branching ratios for parole releases as opposed to expiration releases were based on 1968 to 1971. The second parameter that was changed was the workloads. The two workloads for penitentiary were the time spent in penitentiary before being released on parole and time spent in penitentiary before being released on expiration. Again, this parameter change was based on 1968 to 1971 data. The result of these changes gave us an estimated aggregate penitentiary population of 10,156 inmates for 1974. (For more detail see Table 10 under prediction #2.)

Given the above two predictions we wanted to see what effect changes in other subsystems might have on the penitentiary admissions and population. As such, we changed the branching parameter in the Police subsystem and the adult court subsystem. In the Police subsystem, the branching ratio that was changed was the police clearance rate or the percentage of persons charged compared to the number of offences reported. The basis for this change was 1968 to 1971 data. The second branching ratio that was altered was the sentencing variation or in other words, the percentages of persons who are sentenced to one of the following:

institution, suspended sentence, probation and fine. Again, this sentencing variation branching ratio was based on data for the years 1968 to 1971. These changes in the Police and Court subsystems decreased the penitentiary population by approximately 1,200 inmates giving a population of 8,895 persons. (These results are shown in table 10 under prediction #3.)

As we would have hypothesized the predictions show that the number of penitentiary inmates are dependent upon many other system parameters and their variation. For example, if there is an increasing crime rate with all other variables in the system remaining constant, one would assume that the penitentiary admissions would increase by the same proportion. However, it is unrealistic to assume that the system remains constant from year to year in face of the many system parameters that can change. In this respect the CANJUS model allows the user to test the effect of other system changes on the penitentiary population and admissions.

The interdependency of one agency on another is very evident when one views the parole patterns over the last few years. Between the years 1970 and 1973 the number of persons who were paroled has decreased. Therefore, if we can imagine that the penitentiary population is composed of two sets of inmates - those who have their sentence expired

and those who get paroled - the expirations will become a larger proportion of the population simply because the paroled population is decreasing. As a result of a higher "expiration population" as opposed to the "parole population" (assuming a relatively constant number of admissions and that the mean time served for the expiration population is longer than the parole population), the total penitentiary population will increase.

Because there are many variables in the Canadian Criminal Justice System which have an ultimate effect on the penitentiary population the CANJUS model becomes a very useful tool for exploring changes in these variables and showing the results on the entire system. As such, it is our feeling that this paper has not only provided an estimate of the 1974 penitentiary population and the possible variation of the prediction, but also has shown how various parameters in the system can have a very definite impact on this same population.

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APPENDIX 1

CRIME TYPES

CANADIAN CRIMINAL JUSTICE SYSTEM MODEL

(CANJUS)

1. Murder
2. Attempted Murder
3. Manslaughter
4. Rape
5. Other Sexual Offences
6. Wounding
7. Assault
8. Robbery
9. Breaking and Entering
10. Theft of Motor Vehicle
11. Theft
12. Have Stolen Goods
13. Fraud
14. Prostitution
15. Gaming and Betting
16. Offensive Weapons
17. Other Criminal Code
18. Narcotic Control Act
19. Federal Statutes
20. Provincial Statutes
21. Municipal By-Laws

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